

An Assessment of the Importance of Admission Test for Enrollments in Public Universities of Bangladesh

Mohammad Romel Bhuiya^{1*} --- Sumonkanti Das² --- Khalidur Rahman³--- Khurshid Alam⁴ ---Luthful Alahi Kawsar⁵ --- Md. Kabir Hossain⁶

^{1,2,5}Assistant Professor, Department of Statistics, Shahjalal University Science & Technology, Bangladesh

^{3,4}Associate Professor, Department of Statistics, Shahjalal University Science & Technology, Bangladesh

⁶Professor, Department of Statistics, Shahjalal University Science & Technology, Bangladesh

Abstract

Public universities in Bangladesh arrange admission test to judge the students' merit before the enrollment. Academic results of previous examinations (SSC and HSC) are also considered in the admission procedure. There are some disputes regarding the importance of admission test besides the previous academic records. The universities emphasize on the admission test while the government authorities ponder it as a burden for the students. This study has made an attempt to examine the importance of admission test in selection procedure utilizing a particular year admission test database of Shahjalal University of Science and Technology (SUST). Univariate and bivariate analyses along with regression models were used to analyze the data. The results indicate that students with higher score in both SSC and HSC examinations had higher possibility to be eligible for enrollment. However, a vital proportion of applicants with maximum GPA 5.00 in both examinations did not qualify in merit and waiting position. The results also show association and moderate positive correlation of admission test score with SSC and HSC results. Finally, regression analysis indicates that though the contributions of the SSC and HSC results on admission test scores are significant, the variation in admission test scores is not much explained by the previous records. Such findings recommend arranging admission test, besides academic qualification, to select the eligible applicants for enrollment in public universities.

Keywords: Admission test, Academic records, GPA, Public university, University enrollment.

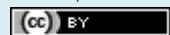
Contents

1. Introduction	10
2. Methods and Materials	10
3. Results	11
4. Discussion	15
5. Conclusion	16
References	16

Citation | Mohammad Romel Bhuiya; Sumonkanti Das; Khalidur Rahman; Khurshid Alam; Luthful Alahi Kawsar; Md. Kabir Hossain (2016). An Assessment of the Importance of Admission Test for Enrollments in Public Universities of Bangladesh. Journal of Education and e-Learning Research, 3(1): 9-16.

DOI: 10.20448/journal.509/2016.3.1/509.1.9.16

ISSN | 2410-9991



This work is licensed under a [Creative Commons Attribution 3.0 License](#)

Asian Online Journal Publishing Group

1. Introduction

The higher education sector in Bangladesh has been expanding significantly for the last two decades. In 1985 there were only 6 universities in Bangladesh, whereas at present there are 117 universities in the country of which 34 are public. Around 2.5 million students are now receiving higher education (Rahman, 2013). However, the expansion of higher education sector is not enough to meet the demand for it.

After completing twelve-year formal education with HSC (Higher Secondary Certificate) exam, students try their best to get an admission in a public university for better higher education. But there are approximately 57,000 seats available in public universities (Rahman, 2013). For example, in 2014, out of 1,147,374 appeared students, 78.33 percent passed in HSC examination with a total of 70,602 students had scored highest GPA 5.00. As a result, about 95 percent of HSC passed students would not able to get scope to the institutions of their first choice. Even a large number of students cannot apply for admission in public universities. This is because, to get qualified students, public universities of Bangladesh usually set some criteria on the achievement of secondary and higher secondary levels. The number of applicants possessing the required academic achievements is usually 40 to 50 times of the available seats of different disciplines. Considering the number of qualified students, the universities normally impose some additional criteria so that the appropriate students could be placed into different programs. Finally, every university has to further sort out the applicants for enrollment through an admission test.

A few works have been conducted in Bangladesh that evaluated the university admission test procedure. Chowdhury and Ahsan (2002) carried out an assessment study of the SUST admission procedure for selecting the best students for enrollment based on the available information obtained from admission test of 1996-97 sessions. The study disclosed several variables that are significantly associated with admission test. Chowdhury et al. (2009) conducted a systematic study to find out the adequacy of the prevailing criteria in selecting the best students in bachelor's programs at university level in Bangladesh. The regression and canonical correlation analyses output show countable importance of the HSC examination compared to the SSC (Secondary School Certificate) examination, and also demonstrate less important admission test procedure on bachelors program. Some medical schools in their selection process focus on intellectual attainments measured by achievement in the school-leaving examination (Collins et al., 1995). However, some believe that reliance on measurements of intellectual and academic ability alone may not be adequate; hence, they advocate the inclusion of interviews in the admission procedure (Glick, 1994). Medical schools in North America consider the undergraduate grade point average (GPA) and the medical college admission test (MCAT) scores to identify candidates for further assessment by interview. Colliver et al. (1989) established the validity of the MCAT and the undergraduate GPA as the main predictors of students' performance in clinical and basic science courses. Glick (1994) strongly suggested that assessments of the academic ability for enrollment should be combined with some personal qualities. He showed that a thoughtful and perceptive interview has an immense effect to increase the quality of admission procedure. In a study of Aga Khan University Medical College students it was found that the admission test score is an important predictor of students' performance (Rahbar et al., 2001). Schwager et al. (2015) conducted a study to investigate the incremental validity of the GRE (Graduate Record Examination) test above undergraduate grade point average (U-GPA) on graduate grade point average (G-GPA). Results indicated that the Analytical Writing part of the GRE predicts G-GPA above and beyond U-GPA.

According to the existing provision in Bangladesh, students must sit in an admission test to enroll in a public university. However, are these admission tests or selection processes effective to choose the appropriate candidates for enrollment in public universities? There is a debate about the admission processes in the universities of Bangladesh. Some policy makers think that the admission test in university level is redundant. Their opinion is that students should be enrolled in universities based on their results of SSC and HSC levels. However, other policy makers believe that admission test must be required to examine their academic and intellectual performance and to select the best students. In this regard, this study has made an effort to explore a solution of these arguments. The main objective of this study is to examine the importance of admission test to select students for enrollment in the public universities of Bangladesh. The specific objectives of the study are to examine the association between the results of SSC and HSC examination with the admission test score, and to examine the impact of students' results in SSC and HSC examinations on their performance in admission test. Although this study focuses on the students appeared in an admission test in a particular university in Bangladesh - Shahjalal University of Science and Technology, it is expected that the findings might be generalized to provide a guideline for the admission process of all public universities in Bangladesh. Since students from science, arts and commerce backgrounds are covered in the study, the generalization can be done easily to all universities in Bangladesh.

2. Methods and Materials

2.1. Study Population

Shahjalal University of Science and Technology (SUST), established in 1991, enrolls students each year in different schools for B.Sc., B.S.S., and B.Sc. Engineering leading to M.Sc., M.S.S., and M. Engineering. Admission tests are conducted under the six faculties, namely, Physical Sciences, Social Sciences, Business Administration, Life Sciences, Agriculture and Mineral Sciences, and Applied Sciences, into four units. The applicants who appeared at the last year admission test were considered as the study population of this research.

Table-1. Study population according to Unit, Schools, and Departments

Units	Schools	Department	No. of Seats	No. of Applicants
Ka	Physical Sciences	Statistics, Mathematics, Chemistry, Physics	260	3080
Kha	Social Sciences, Business Administration	BBA, Economics, Sociology, Social Work, Public Administration, Anthropology, Political Studies, English, Bangla	580	9662
				Continue

<i>Ga</i>	Life Sciences, Agricultural and Mineral Sciences	Genetic Engineering and Biotechnology, Food and Tea Technology, Forestry and Environmental Science	120	3125
<i>Gha</i>	Applied Sciences	Chemical Engineering and Polymer Science, Civil and Environmental Engineering, Industrial and Production Engineering, Computer Science and Engineering, Architecture	240	6081
		Total	1200	21951

Table 1 shows the Schools and Departments according to Units – *Ka*, *Kha*, *Ga*, and *Gha*. An applicant for enrollment in any department must have qualification in SSC and HSC level with required marks/grade and has to face an admission test conducted each year by the university. Generally the admission test takes place at the beginning of the academic year at a suitable time after the announcement of the results of the HSC examination under different boards of Secondary and Higher Secondary Examinations. In the considered year, about 22,000 applicants appeared at that admission test under different units for admission for only 1200 seats.

2.2. Admission Procedure of SUST

An applicant for enrollment has to sit on an admission test conducted by the university. Merit and waiting lists are made considering the obtained mark out of 100 marks where 70 marks come from the admission test score and 30 marks from SSC and HSC results. In the admission test for each unit 70 multiple choice questions of equal marks are set to be answered. For each correct answer an applicant achieves 1.0 mark and for each incorrect answer 0.25 marks is deducted as penalty. To calculate 30 marks from SSC and HSC results the sum of GPAs in SSC and HSC are multiplied by 3.0 for regular students and by 2.7 for irregular students. Merit and waiting lists are constructed on the basis of total marks and the number of available seats for each unit. The students belonging to merit and waiting lists are usually considered for enrollment.

2.3. Source of Data and Variables

The required data have been collected from the admission test database at the Department of Computer Science and Engineering, SUST in digital format. Approval of the study has been made from the corresponding authority. No questionnaire has been arranged as there was no scope to interview the targeted students personally or mailed to respondents. The constructed database has then been analyzed using statistical tools. The students belonging to merit and waiting list are considered as allowed for enrolment in different disciplines under respective unit. The following table (**Table 2**) shows the selected variables from the database.

Table-2. List of dependent and independent variables with their measures and categories

Variable	Independent Variable			Dependent Variable		
	SSC GPA	HSC GPA	Combined Score in SSC and HSC	Admission Test Score (ATS)	Total Admission Score (TAS)	Applicants' Admission Status
Scale	Interval	Interval	Interval	Interval	Interval	Nominal
Categories	Continuous	Continuous	Continuous	Continuous	Continuous	Allowed (Merit and Waiting)=1 Not-allowed=2

2.4. Analysis Techniques

Univariate analyses were adopted to see the descriptive statistics of the admission variables – GPA in SSC and HSC examinations, admission test score (ATS), and total admission score (TAS). Bivariate analyses such as cross tabulation, correlation analysis were employed to see the association and correlation among the admission variables. Multiple linear regression models were also fitted to examine the impact of SSC and HSC result on admission test score. Other statistical tools were applied where necessary. Analyses were performed using MS Excel, SPSS Inc, and MINITAB software.

3. Results

To observe the profile of the applicants' SSC, HSC, and admission test results, descriptive statistics such as minimum, maximum, mean, and standard deviation of SSC, HSC results (GPA), admission test score (ATS), and total admission test score (TAS) were calculated for the units *Ka*, *Kha*, *Ga*, and *Gha*. Since applicants of science, commerce, and humanities background are eligible for the subjects of *Kha* unit, same descriptive statistics are also calculated for the applicants of three groups – science, humanities, and commerce, separately.

Table-3. Descriptive statistics of the applicants' SSC, HSC, ATS, and TAS: Units *Ka*, *Ga*, and *Gha*

Unit	SSC Result			HSC Result			All Applicants		
	Merit and Waiting Applicants			Not Allowed Applicants			All Applicants		
	Min	Max	Mean (\pm SD)	Min	Max	Mean (\pm SD)	Min	Max	Mean (\pm SD)
<i>Ka</i>	3.38	5	4.61 (0.39)	2.56	5	4.28 (0.50)	2.56	5	4.39 (0.50)
<i>Ga</i>	3.63	5	4.92 (0.18)	2.75	5	4.51 (0.47)	2.75	5	4.56 (0.46)
<i>Gha</i>	4.00	5	4.89 (0.21)	3	5	4.59 (0.442)	3	5	4.62 (0.43)
Continue									
Unit	Merit and Waiting Applicants			Not Allowed Applicants			All Applicants		
	Min	Max	Mean (\pm SD)	Min	Max	Mean (\pm SD)	Min	Max	Mean (\pm SD)
<i>Ka</i>	3.10	5	4.73 (0.32)	2.5	5	3.91 (0.54)	2.5	5	4.08 (0.59)

Ga	3.60	5	4.83 (0.27)	2.6	5	4.18 (0.53)	2.6	5	4.25 (0.55)
Gha	4.00	5	4.80 (0.29)	3	5	4.25 (0.54)	3	5	4.30 (0.55)
Admission Test Score (ATS)									
Unit	Merit and Waiting Applicants			Not Allowed Applicants			All Applicants		
	Min	Max	Mean ($\pm SD$)	Min	Max	Mean ($\pm SD$)	Min	Max	Mean ($\pm SD$)
Ka	24.00	51.5	32.37(4.8)	-3.5	33.5	17.22 (6.7)	-3.5	51.5	20.80 (8.9)
Ga	30.00	52.0	35.55 (3.7)	-3.0	36	20.54 (6.4)	-3.0	52	22.32 (8.0)
Gha	19.80	45.5	24.90 (3.6)	-12.5	27.8	11.69 (5.5)	-12.5	45.5	12.96 (6.6)
Total Admission Score (TAS)									
Unit	Merit and Waiting Applicants			Not Allowed Applicants			All Applicants		
	Min	Max	Mean ($\pm SD$)	Min	Max	Mean ($\pm SD$)	Min	Max	Mean ($\pm SD$)
Ka	53.80	81.50	59.80 (4.97)	16.9	53.7	41.15 (8.45)	16.9	81.5	45.68(10.52)
Ga	59.65	80.44	64.17 (3.63)	17.39	59.60	46.02 (7.85)	17.39	80.44	48.17(9.51)
Gha	49.80	75.50	53.58 (3.45)	11.2	49.7	37.74 (6.69)	11.2	75.5	39.26(7.96)

3.1. Descriptive Statistics of SSC, HSC, ATS, and TAS for Ka, Ga, and Gha Units

Table 3 shows descriptive statistics of SSC, HSC results, ATS, and TAS for the applicants of *Ka*, *Ga*, and *Gha* units. The minimum GPA in SSC for the applicants of *Ka*, *Ga*, and *Gha* units were 2.56, 2.75, and 3.0 respectively whereas the maximum GPA were 5.0 for all the three units. In HSC, almost similar results were observed as in SSC. The mean GPA in SSC were 4.39 (± 0.50), 4.56 (± 0.46), and 4.62 (± 0.434) whereas average GPA in HSC were significantly lower [4.08 (± 0.59), 4.25 (± 0.55), and 4.30 (± 0.55)] for Unit *Ka*, *Ga*, and *Gha* respectively (p-value<0.05). For the allowed applicants for enrollments (applicants in merit and waiting lists), average GPA in SSC were found as 4.61 (± 0.39), 4.92 (± 0.18), and 4.89 (± 0.21) for the three units, respectively. In case of HSC, the mean GPAs were 4.73 (± 0.32), 4.83 (± 0.27), and 4.80 (± 0.28), respectively. By using equality of two means test, significant differences were observed between the average GPAs of allowed and not allowed applicants for the three units ($p<0.0001$) in both SSC and HSC.

A surprising fact was observed in case of applicants' admission test scores (ATS). Since in the admission test, negative mark was assigned for incorrect answer, few students got negative mark in the test. In all the three units some students got negative mark (lowest ATS were -3.5, -3.0, and -12.5 in *Ka*, *Ga*, and *Gha* units, respectively). As a result, average ATSs were found very low: 20.80 (± 8.89), 22.32 (± 8.00), and 12.96 (± 6.63) out of 70 marks for the three units, respectively. However, for the eligible applicants in merit and waiting list, the means of ATS were 32.37 (± 4.83), 35.55 (± 3.71), and 24.90 (± 3.60) for the three units, respectively. It indicates lower level inherent capacity of the applicants. Highest admission test score was found in unit *Ga* (52.0) followed by *Ka* (51.5) and *Gha* (45.5). It is to be noted that some students who got less than 20 marks in admission test were also considered in merit and waiting list of *Gha* unit.

The average TASs were found 45.68 (± 10.52), 48.17 (± 9.51), and 39.26 (7.96). On the other hand, for the merit and waiting applicants average TASs were 59.8 (± 4.97), 64.17 (± 3.63), and 53.58 (± 3.45), respectively, for the three units (Table 3). Applicants achieved about 53.65, 59.65, and 49.8 or more out of 100 total admission score got chance in the merit and waiting list of *Ka*, *Ga*, and *Gha* units, respectively. The variation in TAS of the applicants who got chance in merit and waiting list were found very high. The ranges of TAS for the allowed applicants for enrollment were about 28, 20, and 25, respectively, for the three units. The standard deviation was found highest in *Ka* unit (4.97), followed by *Ga* (3.63) and *Gha* (3.45) units.

3.2. Descriptive Statistics of SSC, HSC, ATS, and TAS for Kha Unit by Group

The descriptive statistics of SSC, HSC, ATS, and TAS for the applicants of unit *Kha* according to their subject group are shown in Table 4. In case of SSC results, the minimum GPA varied for the three groups. Minimum GPA in SSC was observed as 2.56, 2.50, and 3.0 respectively for the applicants of science, humanities, and commerce group, respectively.

Table-4. Descriptive statistics of SSC, HSC, ATS, and TAS: Units *Kha* by Group

SSC Result									
Unit	Merit and Waiting Applicants			Not Allowed Applicants			All Applicants		
	Min	Max	Mean ($\pm SD$)	Min	Max	Mean ($\pm SD$)	Min	Max	Mean ($\pm SD$)
Science	3.25	5	4.73 (0.37)	2.56	5	4.21 (0.56)	2.56	5	4.26 (0.57)
Humanities	2.56	5	4.22 (0.55)	2.5	5	3.56 (0.58)	2.50	5	3.63 (0.61)
Commerce	3.00	5	4.55 (0.42)	3	5	3.80 (0.62)	3.00	5	3.82 (0.63)
HSC Result									
Unit	Merit and Waiting Applicants			Not Allowed Applicants			All Applicants		
	Min	Max	Mean ($\pm SD$)	Min	Max	Mean ($\pm SD$)	Min	Max	Mean ($\pm SD$)
Science	2.7	5	4.35 (0.53)	2.5	5	3.73 (0.62)	2.5	5	3.80 (0.65)
Humanities	3.1	5	4.47 (0.43)	2.5	5	3.76 (0.56)	2.5	5	3.83 (0.59)
Commerce	3.0	5	4.62 (0.36)	3	5	4.0 (0.59)	3	5	4.02 (0.60)
Admission Test Score (ATS)									
Unit	Merit and Waiting Applicants			Not Allowed Applicants			All Applicants		
	Min	Max	Mean ($\pm SD$)	Min	Max	Mean ($\pm SD$)	Min	Max	Mean ($\pm SD$)
Science	30.75	55.0	39.00 (4.84)	-2.5	40	20.96 (7.66)	-2.5	55.0	23.18 (9.46)
Humanities	28.00	55.0	37.60 (4.97)	-5.0	39	18.04 (8.05)	-5.0	55.0	20.11 (9.84)
Commerce	36.50	57.8	42.23 (3.93)	-5.0	43.3	19.24 (9.01)	-5.0	57.8	20.02 (9.81)

Continue

Unit	Total Admission Score (TAS)								
	Merit and Waiting Applicants			Not Allowed Applicants			All Applicants		
	Min	Max	Mean ±SD	Min	Max	Mean ±SD	Min	Max	Mean ±SD
Science	59.7	80.0	65.22 (4.29)	13.43	59.65	44.12 (8.94)	13.43	80.0	46.72 (10.98)
Humanities	57.1	85.0	62.91 (4.85)	15.00	57.00	39.59 (9.11)	15.00	85.0	42.07 (11.35)
Commerce	65.00	79.5	68.58 (2.80)	13.70	64.90	42.23 (10.61)	13.70	79.5	43.13 (11.48)

However, for all the groups maximum GPA was found same (5.0) as other units. Average GPA in SSC was found 4.26(±0.57), 3.63(±0.61), and 3.82(±0.63) for the applicants with science, humanities, and commerce background, respectively, which represent lower level capacity of the applicants in SSC level. However, in case of the allowed applicants for enrollment mean GPAs in SSC were found 4.73 (±0.37), 4.22 (±0.55), and 4.55 (± 0.42) for the three groups respectively. The applicants having minimum GPA 2.5 in HSC were considered for the admission test. As a result the minimum GPA in HSC was found 2.5 for the applicants of Science and Humanities groups. However, for commerce group it was found GPA 3.0. Average GPA in HSC were found 3.80 (±0.65), 3.83 (±0.59), and 4.02 (±0.60) for science, humanities, and commerce groups, respectively. However, for the allowed group, mean GPAs in HSC (4.35, 4.47, and 4.62 for science, humanities, and commerce) were significantly lower compared to that of other three units (more than 4.70).

In case of *Kha* unit, like other three units, the minimum ATS were -2.5 for Science group, -5.0 for both Humanities and Commerce groups, respectively. On the other hand, the maximum ATS were 55 for Science and Humanities groups and 57.8 for Commerce group. Average admission test scores were found more than 20 for all the three groups. Applicants of commerce group, considered in merit and waiting list, got highest ATS (57.8) and their average was also found highest (42.23). Like *Ka*, *Ga*, and *Gha* units, average of not-allowed applicants' ATS was found significantly lower than that of the allowed applicants for all the three groups.

Observing the maximum TAS values, it was found about 80 for the both the Science and Commerce groups and 85 for Humanities group. The average TAS were 46.72 (±10.98), 42.07 (±11.35), and 43.127 (±11.4781) for the three groups respectively. However, the average TASs for the applicants of merit and waiting list were 65.22 (±4.29), 62.91 (±4.85), and 68.579 (±2.7978) respectively. In case of unit *Kha*, it was observed that applicants having about 60 percent TAS got chance in the merit and waiting list from science and humanities groups but it was 65 percent for applicants of commerce group. The ranges of ATS for the applicants who got chance in merit and waiting list of units *Kha* from science, humanities, and commerce background were about 20, 28, and 15, respectively.

3.3. Association of SSC and HSC Results with Admission Results

The University authority converts SSC and HSC results of the applicants into 30 marks. This mark has been utilized to examine the association of SSC and HSC results with admission results employing chi-square test.

3.3.1. Association in *Ka*, *Ga*, and *Gha* Units

The cross-table in Table 5 shows the categories of applicants according to their score. From the table it is also clear that the applicants with more score have more possibility to get chance in merit and waiting list. About 40, 18.6, and 13.4 percents of the applicants of *Ka*, *Ga*, and *Gha* units, respectively, having higher score (more than 25.0) were listed in merit and waiting positions. On the other hand, among the applicants belonging to merit and waiting list of *Ka*, *Ga*, and *Gha* units 83.6, 96.8, and 95.5 percents had score more than 25.0. It is to be noted that the applicants having scores less than 20 did not get chance. The p-values indicate that, at 5 percent level of significance, there is an association between score on SSC and HSC levels, and the selection for enrollment.

Table-5. Association of SSC and HSC (Combined) results with Admission Results: Units *Ka*, *Ga*, and *Gha*

Score on SSC and HSC Results	Unit <i>Ka</i>		Unit <i>Ga</i>		Unit <i>Gha</i>	
	Merit and Waiting (%)	Not Allowed (%)	Merit and Waiting (%)	Not Allowed (%)	Merit and Waiting (%)	Not Allowed (%)
Higher (25.01-30.0)	589 (40.3)	872 (59.7)	358 (18.6)	1566 (81.4)	554 (13.4)	3588 (86.6)
Moderate (20.01-25)	114 (8.0)	1308 (92.0)	12 (1.1)	1088 (98.9)	26 (1.5)	1736 (98.5)
Lower (≤ 20)	1 (0.5)	181 (99.5)	-	93 (100)	-	131 (100)
Chi-square (p-value)	479.829 (0.000)		218.173 (0.000)		215.733 (0.000)	

3.3.2. Association in *Kha* Unit by Group

Table 6 shows the cross-tabulation of applicants according to combined score on SSC and HSC and their admission result for the *Kha* unit by the applicants' subject. It is also clear from Table 6 that the applicants with more

Table-6. Association of SSC and HSC (Combined) results with Admission Results: Unit *Kha* by Group

Score on SSC and HSC Results	Science		Humanities		Commerce	
	Merit and Waiting (%)	Not Allowed (%)	Merit and Waiting (%)	Not Allowed (%)	Merit and Waiting (%)	Not Allowed (%)
Higher (25.01-30.0)	218 (25.6)	635 (74.4)	257 (33.3)	515 (66.7)	65 (8.4)	711 (91.6)
Moderate (20.01-25)	109 (7.7)	130 (92.3)	166 (7.7)	1980 (92.3)	24 (1.8)	1338 (98.2)
Lower (≤ 20)	3 (0.7)	408 (99.3)	27 (2.0)	1294 (98.0)	1 (0.2)	517 (99.8)
Chi-square (p-value)	216.643 (0.000)		539.348 (0.000)		86.132 (0.000)	

score have more possibility to get chance in merit and waiting list. The percentages of allowed applicants were 25.6, 33.3, and 8.4 for the higher scored group of science, humanities, and commerce background applicants, respectively. In other hand, among the allowed applicants 66.06, 57.11, and 72.22 percent were from the higher scored group of science, humanities, and commerce background applicants, respectively. It is clear that other allowed applicants came from the moderate scored group. However, a few applicants with scores less than 20 had got chance in the merit and waiting position. Again, the p-values indicate that, at 5 percent level of significance, there is an association between score on SSC and HSC levels, and the selection for enrollment.

Though a significant relationship has been observed between academic record and admission result, it is not guaranteed that all the applicants with highest GPA in SSC and HSC levels have perfect chance to belong in the merit list, even in the waiting list. To see the reality the study has also examined applicants who got chance in the merit and waiting list.

Table-7. Distribution of applicants belonging to Merit and Waiting List by SSC & HSC GPA: *Ka*, *Ga*, and *Gha* units

Result in SSC and HSC	<i>Ka</i> Unit			<i>Ga</i> Unit			<i>Gha</i> Unit		
	Merit (%)	Waiting (%)	Allowed (%)	Merit (%)	Waiting (%)	Allowed (%)	Merit (%)	Waiting (%)	Allowed (%)
GPA 5.00 in both HSC and SSC	95 (27.07)	46 (13.03)	141 (20.03)	89 (52.35)	74 (20.0)	163 (44.05)	122 (45.19)	111 (35.81)	233 (40.17)
GPA 5.00 in SSC	63 (17.95)	61 (17.28)	124 (17.61)	39 (22.94)	62 (16.76)	101 (27.05)	67 (24.81)	77 (24.84)	144 (24.83)
GPA 5.00 in HSC	52 (14.81)	43 (12.18)	95 (13.49)	20 (11.76)	18 (4.86)	38 (10.27)	31 (11.48)	42 (13.55)	73 (12.59)
Others	141 (40.17)	203 (57.51)	344 (48.86)	22 (12.94)	46 (12.43)	68 (18.38)	50 (18.52)	82 (26.45)	132 (22.76)
Total	351	353	704	170	200	370	270	310	580

Table-8. Distribution of applicants belonging to Merit and Waiting List by SSC and HSC GPA: *Kha* unit by Group

Result in SSC and HSC	Science			Commerce			Humanities		
	Merit (%)	Waiting (%)	Allowed (%)	Merit (%)	Waiting (%)	Allowed (%)	Merit (%)	Waiting (%)	Allowed (%)
GPA 5.00 in both HSC and SSC	41 (18.64)	14 (12.73)	55 (16.67)	12 (20.00)	1 (3.33)	13 (14.44)	26 (8.67)	10 (6.67)	36 (8.00)
GPA 5.00 in SSC	54 (24.55)	34 (30.91)	88 (26.67)	6 (10.00)	3 (10.00)	9 (10.00)	13 (4.33)	7 (4.67)	20 (4.44)
GPA 5.00 in HSC	13 (5.91)	4 (3.64)	17 (5.15)	6 (10.00)	2 (6.67)	8 (8.89)	36 (12.00)	13 (8.67)	49 (10.89)
Others	112 (50.91)	58 (52.73)	170 (51.52)	36 (60.00)	24 (80.00)	60 (66.67)	225 (75.00)	120 (80.00)	345 (76.67)
Total	220	110	330	60	30	90	300	150	450

Table 7 clearly indicates that in *Ka* unit only 27 percent applicants with GPA 5.00 in both SSC and HSC levels and 40 percent applicants with no GPA 5.00 in any level listed in the merit position. In *Ga* and *Gha* units, about 52 percent and 45 percent applicants with GPA 5.00 in both SSC and HSC levels listed in merit position. The percentages of allowed applicants with no GPA 5.00 in any level were also found remarkable in *Ga* and *Gha* units (18.38 and 22.76 percent, respectively). Table 8 clearly indicates that significant proportion of applicants in *Kha* unit (51.52, 66.67, and 76.67 percent applicants with science, commerce, and science background, respectively) listed as allowed for enrollment have come from the group who had no GPA 5.00 in any levels.

3.4. Correlation of SSC and HSC Results with Admission Test Scores

In general, the concept of correlation describes the direction and strength of mutual relationship between two variables (Gujarati, 2003). The simple correlation coefficient measures the degree of linear relationship between two variables and the partial correlation measures the degree of relationship between two variables, with the effect of a set of other random variables removed. Table 9 presents the simple correlation coefficients and partial correlation coefficients of SSC and HSC GPAs with the admission test score. The correlation coefficients between the ATS and the GPA in SSC and HSC levels have the expected signs. It is observed that for all the units there were significant positive association of SSC and HSC results with admission test scores. The correlation of HSC result with admission test scores was found highest for *Ka* unit ($r = 0.54$) and *Ga* unit ($r = 0.54$) and lowest for *Kha* unit with science background ($r = 0.36$). Meanwhile, the association of SSC result with admission test score was found lowest for *Gha* unit ($r = 0.29$) and highest for *Kha* unit with commerce background ($r = 0.46$).

Partial correlation coefficients ($r_{xy.z}$) of SSC and HSC with ATS were also estimated to examine the real fact. Partial correlation coefficients ($r_{xy.z}$) for SSC result was found lower than HSC GPA in all the units with an exception with the applicants of *Kha* unit with commerce background. In case of SSC results $r_{xy.z}$ was found highest for the applicants of *Kha* unit with commerce background (0.2916, $p < 0.001$). On the other hand, $r_{xy.z}$ for HSC result was found highest for *Ka* unit (0.40), followed by *Ga* (0.39) and *Gha* (0.33). These findings indicate that HSC result had higher association with ATS than that of SSC result. Such findings support the results of previous studies (Chowdhury et al., 2009). It is noteworthy to mention that the degree of association of HSC result were found higher in all units that provide opportunity to enroll in science related subjects.

Table-9. Correlation Coefficient (r_{xy}) and Partial Correlation Coefficient ($r_{x,y}$) of SSC and HSC Results with ATS according to Units

Unit	SSC*		HSC*	
	r_{xy}	$r_{x,y,z}$	r_{xy}	$r_{x,y,z}$
Ka	0.392	0.1054	0.535	0.4008
Kha (Science)	0.411	0.1401	0.364	0.2469
Kha (Commerce)	0.459	0.2916	0.439	0.2604
Kha (Humanities)	0.326	0.1183	0.431	0.3128
Ga	0.420	0.1453	0.536	0.3910
Gha	0.291	0.0564	0.438	0.3335

* All coefficients are significant ($p < 0.001$)

3.5. Effects of HSC and SSC Results on Admission Test Scores

Six multiple linear regression models of admission test scores (ATS) on HSC and SSC results were fitted to see how HSC and SSC results are affecting the admission test scores. The considered models are:

$$Y_A = \beta_{0A} + \beta_{1A}HSC + \beta_{2A}SSC + \varepsilon_A \dots \text{(i)}$$

$$Y_{Bs} = \beta_{0Bs} + \beta_{1Bs}HSC + \beta_{2Bs}SSC + \varepsilon_{Bs} \dots \text{(ii)}$$

$$Y_{Bc} = \beta_{0Bc} + \beta_{1Bc}HSC + \beta_{2Bc}SSC + \varepsilon_{Bc} \dots \text{(iii)}$$

$$Y_{Bh} = \beta_{0Bh} + \beta_{1Bh}HSC + \beta_{2Bh}SSC + \varepsilon_{Bh} \dots \text{(iv)}$$

$$Y_C = \beta_{0C} + \beta_{1C}HSC + \beta_{2C}SSC + \varepsilon_C \dots \text{(v)}$$

$$Y_D = \beta_{0D} + \beta_{1D}HSC + \beta_{2D}SSC + \varepsilon_D \dots \text{(vi)}$$

where, A = Ka Unit, Bs = Kha Unit (Science), Bc = Kha Unit (Commerce), Bh = Kha Unit (Humanities), C = Ga Unit, D = Gha Unit, Ys and es are the corresponding ATS and error terms respectively.

Analysis of the residuals from each fitted model showed that the underlying assumptions of normality and homogeneity were fulfilled. The results of multiple regression analysis are presented in [Table 10](#). From the table it is observed that regression constants for Ka, Kha-Science, Kha-Commerce, Kha-Humanities, Ga, and Gha units are -17.32, -7.80, -16.37, -10.50, -16.82, and -11.55, respectively. Regression coefficients of HSC and SSC results were found positive and significant and they indicate significant positive contributions of HSC and SSC results on admission test scores (ATS). For one grade point increase in the HSC GPA, the scores of the admission test increased by 7.12, 6.40, and 4.69 in Ka, Ga, and Gha units respectively. In case of Kha unit, the regression coefficients were 2.46, 4.50, and 5.98 for the applicants of science, humanities, and commerce background, respectively. Similarly, for one grade point increase in SSC GPA the scores of the admission test increased by 2.05 for Ka unit, 5.06 for Kha unit with science background, 4.77 for Kha unit with commerce background, 2.10 for Kha unit with humanities background, 2.61 for Ga unit, and 0.91 for Gha unit. The values of R-square for all the six models were found very low but the models were significant. Such finding realizes to take account of the socio-economic, demographic and other related factors along with the current means of selecting process.

Table-10. Effects of HSC and SSC results on Admission Test Score according to Different Units: A Multiple Linear Regression Analysis

Unit	Intercept	HSC GPA	SSC GPA	Standard error (HSC, SSC)	R ²
Ka	-17.315	7.120*	2.048*	0.287,0.341	.28
Kha-Science	-7.802	2.462*	5.061*	0.337,0.384	.19
Kha-Commerce	-16.376	4.503*	4.786*	0.324,0.305	.26
Kha-Humanities	-10.498	5.980*	2.104*	0.273,0.266	.19
Ga	-16.818	6.403*	2.609*	0.270,0.318	.30
Gha	-11.551	4.687*	0.941*	0.171,0.214	.18

* Significant at 5% level of significance

4. Discussion

The aim of an admission system in a multidisciplinary university is to select the appropriate students from a huge number of applicants for the enrollment in different departments. The selection criteria should be chosen to be predictive of future performance in the programs and thereafter in professional life. The accuracy of selection relies on the identification of appropriate admission criteria. In the present study an investigation has been carried out to evaluate the existing admission process for bachelor's programs in SUST as a case study of public universities in Bangladesh.

Findings of the study show that results in HSC were comparatively lower than that of in SSC examination. Average GPAs in SSC and HSC were very high for the allowed applicants' of Ga and Gha units compared to Ka unit. The main reason for this variation may be the applicants' preference of Ga and Gha unit to Ka unit due to the departments belonging to these units. In case of Kha unit, average GPA in SSC and HSC was lower than that of other three units for all the three groups. However, for the allowed applicants, the average GPAs in both SSC and HSC were more than 4.00, but lower than that of other three units. It is remarkable to note that a few students with lower GPA both in SSC and HSC also get opportunity to be admitted in the departments of all units (3.00-3.50 for Ka, Ga, and Gha units; 2.50-3.00 for Kha Unit). Negative marks in admission test (out of 70 marks) indicate a shocking fact of the applicants IQ. Average ATSSs were very poor. For unit Ka, it was <15.0 and for the other units a little bit more than 20.0. However, for the merit and waiting applicants mean ATSSs were more or less 50.0 percent of 70 marks.

Findings support the statement that the higher the score in SSC and HSC examinations the higher the possibility to be included in the merit and waiting list for all the units. A notable proportion of applicants having GPA 5.00 in both SSC and HSC did not qualify in the merit and waiting position, which justifies the necessity of admission test as a criterion for enrolment in the universities. Since the proportion of selected applicants with GPA less than 4.0 in unit Ka, Ga, and Gha were negligible, it may be suggested that applicants with very low GPA are not necessary to allow

to sit for an admission test. That is, the eligibility criteria for admission test could be set at minimum GPA 4.00 in both SSC and HSC.

Comparatively higher simple and partial correlation of HSC with ATS than that of SSC indicates that HSC result is a crucial factor for the units *Ka*, *Ga*, and *Gha*. However, the correlation coefficients of SSC and HSC results with ATS were almost close for unit *Kha* (all the groups) indicating equal importance of both SSC and HSC results for admission. On the other hand, the negative regression constants may indicate that applicant with low GPA and lack of preparation/subject knowledge had a high chance to provide incorrect answer in the admission test and hence obtaining negative marks. Regression coefficients signify the contribution of HSC and SSC on ATS. For all the units there were strong significant positive contributions of HSC and SSC results on admission test scores. It is evident from the findings that for the faculties of physical sciences, applied sciences and life sciences (*Ka*, *Gha*, and *Ga* units) HSC result had more contribution to the admission test scores than the SSC result. Thus more attention should be paid to the HSC result for admission in the science faculties. Whereas, for schools of social sciences and business administration, both the SSC and HSC result have equal importance for admission. Low values of R-squares for all the six models indicate that although SSC and HSC GPA have significant positive impact on admission test scores for all the units, there are some other variables which were not considered in the analysis may have positive effects in the variation of the admission test scores.

5. Conclusion

This study focused on the students appeared in an admission test in a particular university in Bangladesh - Shahjalal University of Science and Technology, and expected that the findings might be generalized to provide a guideline for the admission process of all public universities in Bangladesh. The findings of the study suggest that the admission test is an important factor to judge the merit of the applicants since a significant proportion of applicants having highest GPA in SSC and HSC but they did not get chance in the merit and waiting position to be eligible for enrollments. Students are needed to be sort out according to their SSC and HSC results before appearing in the admission test. It may be suggested that applicants with lower GPA (< 4.0) both in SSC and HSC are redundant to appear in the admission test since the proportion of selected applicants with GPA less than 4.0 in unit *Ka*, *Ga*, and *Gha* were found negligible. More importance should be given to the HSC result for admission in science faculties. For social science faculties equal importance should be given to both SSC and HSC results for enrollments.

References

Chowdhury, M.A.K. and M.H. Ahsan, 2002. Selecting the best students for admission: A statistical Panorama of SUST. *SUST Studies*, 4: 1-9.

Chowdhury, M.A.K., K. Rahman, R. Ali, T. Sultana and M. Rana, 2009. Effects of admission criteria on the students performance in bachelor's programs: A systematic review from Bangladesh. *Journal of Business, Society and Science*, 1(1): 52-73.

Collins, J., G. White and J. Kennedy, 1995. Entry to medical school: An audit of traditional selection requirements. *Medical Education*, 29(1): 22-28.

Colliver, J.A., S.J. Verhulst and R.G. Williams, 1989. Using a standardized-patient examination to establish the predictive validity of the MCAT and undergraduate GPA as admissions criteria. *Academic Medicine*, 64(8): 482-484.

Glick, S., 1994. Selection of medical students: The Beer-Sheva perspective. *Medical Education*, 28(4): 265-270.

Gujarati, D.N., 2003. Basic econometrics. New York: McGraw Hill.

Rahbar, M.H., C. Vellani, F. Sajan, A.A. Zaidi and L. Akbarali, 2001. Predictability of medical students performance at the Aga Khan university from admission test scores, interview ratings and systems of education. *Medical Education*, 35(4): 374-380.

Rahman, M.M., 2013. Annual Report 2012: The University Grants Commission of Bangladesh.

Schwager, I.T., U.R. Hüsleger, B. Bridgeman and J.W. Lang, 2015. Graduate student selection: Graduate record examination, socioeconomic status, and undergraduate grade point average as predictors of study success in a Western European university. *International Journal of Selection and Assessment*, 23(1): 71-79.